APPENDIX H

QUALITY ASSURANCE PROJECT PLAN

ARSYNCO, INC. PROPERTY
511 13th Street
Carlstadt Borough, Bergen County, NJ
PI # 024248

Prepared by:

JMC ENVIRONMENTAL CONSULTANTS, INC.
2109 Bridge Avenue, Bldg. B
Point Pleasant, New Jersey 08742

Signatures:

James Clabby _____ **Date:** _____

Steven Kosch _____ **Date:** _____

Effective May 2016

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1.0 INTRODUCTION

Sampling associated with certain site remediation activities planned for the Arsynco, Inc. property located at 511 13th Street in the Borough of Carlstadt, Bergen County, New Jersey are addressed within this Quality Assurance Project Plan (QAPP). The objective of the QAPP is to ensure that field sampling procedures, sample data and reporting meet the project objectives.

This QAPP is included as Appendix H of the May 2016 Remedial Investigation Report (RIR) addendum prepared for the site. This QAPP addresses sampling related to assuring the effectiveness of remedial activities for soil and groundwater contamination, including the Air Sparge/Soil Vapor Extraction system (AS/SVE). Certain project activities will be completed in accordance with this QAPP, and appropriate parts of the United States Environmental Protection Agency's (EPA) Title 40 of the Code of Federal Regulations (CFR) and the relevant New Jersey Department of Environmental Protection (NJDEP) regulations.

1.1 PROJECT DEFINITION

The project includes the collection of groundwater and soil samples related to tracking groundwater quality and assuring soil and groundwater quality following completion of planned remedial actions.

2.0 PURPOSE OF THE QUALITY ASSURANCE PROJECT PLAN

The QAPP, which was prepared in the accordance with Federal and State regulations and guidelines. The QAPP will ensure that the remedial field sampling procedures, analytical methods, and chemical analytical data are of sufficient quality to meet the intended uses.

This QAPP will be amended or revised to include site-specific quality assurance/quality control (QA/QC) procedures as specific conditions and additional information warrant. Should additional phases of work be required, an addendum will be prepared to cover those activities, if necessary. Where differences exist between this QAPP and the Standard Operating Procedures (SOPs) in Attachment A, work will be performed in accordance with the following order of precedence: 1. QAPP, 2. SOPs. This approach is intended to ensure that site-specific concerns are reflected in the sampling program.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

3.1 JMC PROJECT DIRECTOR AND FIELD SUPERVISOR

The project will by directed by James Clabby, of JMC, who can be reached at 732-295-2144. The Health and Safety field supervisor and Quality Assurance Coordinator assigned to this project is Steven Kosch, of JMC.

3.1.1 PROJECT TASKS AND DESCRIPTION

The groundwater sampling program will include the collection of groundwater samples at various monitoring well points associated with the site. Wells will be monitored for the contaminants of concern and the results stored in a database for analysis. Soil samples will be collected throughout the soil remediation activities. The AS/SVE system will be monitored as needed during operation, and soil and groundwater sampling will be conducted to verify the effectiveness of the AS/SVE treatment.

Groundwater samples will be compared to NJDEP GWQS at NJAC 7:9C. Soil samples will be compared to NJDEP Soil Cleanup Criteria. AS/SVE air samples will be sampled in accordance with the NJDEP Air Permit (PCP140001) issued for this system.

3.1.2 FIELD QUALITY CONTROL

Analyte	DQI	Data Quality Element	Frequency of Collection	Acceptance Criteria	Corrective Action(s)
VO^{+15}/SVOC/ Metals/EPH/ PCB/Phenols	Accuracy	Field Blank	(1) Sample per Sampling Day or 20 Samples	Analytes < RL/Below SRS Stds	Qualify sample data associated with Blank with any Analyte > RL
VO^{+15}	Accuracy	Trip Blank	(1) Sample per Delivery Group	Analytes < RL/Below SRS Stds	Qualify sample data associated with Blank with any Analyte > RL
PCB	Accuracy	Field Duplicate	(1) Sample per 20 Samples	Analytes < RL/Below SRS Stds	Qualify sample data associated with Blank with any Analyte > RL

3.2 LABORATORY SELECTION

The analytical laboratory selected for the remedial programs will be Integrated Analytical Laboratory (IAL) of Randolph, New Jersey. IAL is a New Jersey State certified laboratory (NJ Certification # 14751) capable of completing the required analysis. Kim James and Stephen Reduker are the laboratory contacts assigned to this project and can be reached at 888-425-5603 extension 104 and 973-361-4252 respectively. A copy of the selected

Laboratory's Quality Assurance Plan (LQAP) is included as Attachment B. If the selected laboratory changes during the course of this project this QAPP will be updated to reflect the new laboratory's LQAP.

4.0 QUALITY ASSURANCE OBJECTIVES FOR DATA COLLECTION

Groundwater and soil samples collected for analysis will be analyzed by a NJ-certified analytical laboratory using approved USEPA methodologies for the parameters required to be tested. NJ-Reduced data deliverables will be submitted for confirmatory sample analysis.

4.1 DATA QUALITY PROTOCOLS

Analyses of groundwater samples collected from the Arsynco site will be performed following the Environmental Protection Agency (EPA) methodology referenced in *Standard Operating Procedure for Ground Water Sampling (US EPA Region 1. Groundwater Sampling, Revision 0. January 9, 2003).*

Analyses for soil samples collected from the Arsynco site will be performed following the EPA methodology referenced in *Test Methods for Evaluating Solid Waste Physical/Chemical Methods* (EPA SW846).

Analysis for air samples collected from the Arsynco site will be performed following EPA Method 15.

The data quality protocols will include, but may not be limited to, analytical data quality requirements, data quality assessments, subsequent qualifiers, and required documentation. Method detection limits are those specified by the referenced EPA method with allowances for dilutions and dry weight conversions.

4.2 DATA QUALITY ASSESSMENTS (PARCCS)

4.2.1 DATA PRECISION

Precision is defined as a measure of mutual agreement among individual measurements of the sample property. Precision will be evaluated by the analysis of laboratory and matrix spike duplicate samples at the rate specified in the standard method. Precision will be calculated as relative percent difference and will be evaluated by the acceptance criteria specified in the standard method.

4.2.2 DATA ACCURACY

Accuracy is defined as the degree of agreement of a measurement or average of measurements with an accepted reference or true value. Accuracy will be evaluated by use of calibration and calibration verification procedures, laboratory control samples, surrogates, and matrix spikes (see Attachment B).

4.2.3 DATA REPRESENTATIVENESS

Samples will be collected in a standardized manner that will result in representative data. The procedures outlines in this QAPP are designed so that the samples collected will present an accurate representation of actual site conditions.

4.2.4 DATA COMPARABILITY

Standardized sampling techniques and analytical methods will be used to attain stated project objectives. Data comparability will be ensured by control of sample collection methodology, analytical methodology, and data reporting. This QAPP and the sampling methodologies are designed to minimize comparability concerns regarding sampling techniques.

The level of laboratory deliverables (NJ Reduced) will maximize comparability of analytical results. The use of the appropriate NJDEP/EPA approved methodologies will ensure data comparability.

4.2.5 DATA COMPLETENESS

Overall project completeness will be assessed upon the conclusion of sampling and receipt of sample data acquired over the duration of the project up to each report submission.

4.2.6 DATA SENSITIVITY

Reporting Limits (RLs) are to be below the relevant and applicable regulatory limits for each contaminant of concern (COC) to be analyzed. COCs to be analyzed are referenced in Section 5.2.4.

4.3 DATA MANAGEMENT

Data management throughout the project duration is outlined in Sections 5, 6 and 8.

5.0 SAMPLING PROCEDURES

5.1 PRE-SAMPLING PREPARATION

Non-disposable sampling equipment (e.g.- pumps, water level meters, trowels etc.) will be cleaned and wrapped in aluminum foil prior to arrival on-site. Field decontamination will be performed between sampling locations in accordance with JMC's SOPs. Large equipment, such as well installation rigs or geoprobes, backhoes and excavators will be decontaminated prior to the start of sampling activities. Decontamination will consist of a pressurized hot water "steam" wash. Whenever practical, dedicated and disposable sampling equipment will be used.

5.1.1 CLEANING MATERIALS

Laboratory grade detergent will be a standard brand of phosphate-free detergent such as Alconox or Liquinox. Pesticide-grade acetone will be used as a cleaning solvent, when appropriate. A 10% nitric acid solution will be used when decontaminating equipment used for metals sampling. Tap water will be taken from the municipal water supply. ASTM Type II, deionized, distilled, analyte-free water will be used as the final water rinse.

5.1.2 FIELD DECONTAMINATION PROCEDURES

Non-disposable sampling equipment will be decontaminated prior to each use according to the JMC's SOP for sampling equipment decontamination. JMC's field SOPs for decontamination of sampling equipment are provided in Attachment A.

5.1.3 ANALYTE-FREE WATER

The analytical laboratory must maintain quality control records for blank water and rinse water, in order to demonstrate, on a regular basis, that target compound concentrations are less that the quantitation limit, as defined in EPA SW846.

5.2 SITE SAMPLING

5.2.1 SAMPLE LOCATIONS

The groundwater sampling program will include the collection of groundwater samples at various monitoring well points associated with the site.

Soil samples will be collected from various established AOCs.

PCB excavation base sampling will be performed in accordance with the EPA approved sampling approach of a frequency of one sample per 50 feet of excavation base.

5.2.2 SAMPLE DESIGNATION AND TASK DOCUMENTATION

Each sample collected will be assigned a sample designation according to a pre-determined numbering system. The sample designation includes, in abbreviated form: the sample name/number and the sample date and time collected. These sample designations will be written in ink on an identification label which will be attached to the sample container.

5.2.3 SAMPLING EQUIPMENT AND PROCEDURES

A description of the sampling protocol and equipment associated with the groundwater and soil sampling activities is provided in the SOPs provided in Attachment A. Sample containers will be placed in an ice-filled cooler for shipment to the laboratory. Section 6.0 describes sample handling procedures. The following table is also provided below highlighting container types, preservation, and holding times for the parameter group samples that will be tested.

5.2.4 SAMPLING SUMMARY TABLE

Parameter Group	Method	Container	Preservation	Holding Time
Volatile Organics	SW-846 8260C	2 x 40 mL GTLS Vials	HCl pH < 2 ZHS/4°C	14 Days
Metals	SW-846 6020A	250 mL plastic or glass	HN03/Cool 4°C	180 Days
Semi-Volatile Organics	SW-846 8270D	1L Glass	Cool 4°C	7 Days Extract
EPH	SW-846 8270D	1L Glass	HCL/Cool 4°C	14 Days
PCB	SW-846 8082A	2oz Glass	Cool 4°C	14 Days
Phenols	SW-846	100 ml	H2S04<2, Cool 4°C	28 Days

5.3 SAMPLE PRESERVATION

Groundwater and soil samples for laboratory analysis will be collected in the appropriate laboratory designated containers with the necessary applicable preservative. Samples will be kept secured and at 4°C until they are analyzed.

5.4 FIELD DATA DOCUMENTATION/FIELD LOGS

Pertinent data collected during sampling operations will be entered into bound field logbooks. Each page will be numbered, dated, and initialed by the person making the entry. Entries will be made in ink. Errors will be crossed out with a single line, initialed, and dated. Each page will be countersigned, if possible. At the completion of each day, if a page is not complete, a diagonal line will be drawn through the remainder of the page with the signature(s) at the bottom of the page.

Sample locations will be recorded and referenced to a site map so that each location is permanently established. Samples will be tagged or labeled with pertinent site information at the time of sampling. Section 6.1 describes the sample identification requirements. Pertinent site information to be supplied in the field logbook for each task is as follows:

- Signature of note taker
- Name and location of investigation
- Date and time of arrival and departure
- Names of personnel at the project site/work area and their affiliation or reference to daily sign-in log
- Purpose of the visit
- Field instruments used, date and time of calibration and calibration checks, method of calibration, and standards used
- Field measurement results
- Date, time, and location of sampling points
- Factors which could affect sample integrity
- Name of sampler
- Sample identification, sample description
- Documentation of conversations with Client, regulatory agency personnel, field decisions, and approval of modifications to this QAPP or the site workplan
- Weather conditions

Field logbooks should contain only factual information entered as real-time notes which will enable the user to recreate events on-site. Logs will be maintained in the field logbook. The field logbook is a part of the project file and is admissible as evidence in litigation.

6.0 SAMPLE CUSTODY/SAMPLE CONTROL

A sample is physical evidence collected from the project site. Due to the evidentiary nature of the data collected, the possession of samples must be traceable from the time the empty sample containers are prepared by the container supplier through the reporting of the analytical results.

As an essential part of project management, sample control procedures have been established to ensure sample integrity. Sample containers and samples will be maintained under strict custody procedures throughout the investigation.

6.1 SAMPLE IDENTIFICATION

1. Each container will be labeled by the sampler to avoid the possibility of sample misidentification.
2. At a minimum, each label will contain the following information:
    - Site Name
    - Sample designation number (field number)

- Date sampled
- Time sampled

3. At the Laboratory, each sample will be assigned a unique laboratory identification number that will be used for analysis assignment, sample tracking, and data reporting while the samples are at the laboratory.

6.2 SAMPLE CUSTODY

Samples collected for chemical analysis on each sampling day will be considered under custody if:

1. They are in the custodian's possession.
2. They are in view, after being in the custodian's possession.
3. They were in the custodian's possession and were locked up or sealed in a tamper-proof manner.
4. They are placed in a designated secure area.

6.3 SAMPLE CUSTODY PROCEDURES

1. Empty, clean sample containers will be relinquished by the analytical laboratory on a lab bottle order delivery form.
2. Transfer of custody of containers or samples will be noted on the chain-of-custody record.
3. Each sample collected for the project will be entered on a chain-of-custody record.
4. The original chain-of-custody record will accompany the sample containers during transport, to document their custody.
5. If custody is relinquished through a common parcel carrier for delivery to the laboratory, the following protocol will be followed:
    a. The original chain-of-custody record will be placed inside the shipping package.
    b. The shipping package will be sealed with strapping tape and a custody seal will be affixed. The seal will be placed on the package in such a manner that the package cannot be opened without breaking the seal. The seal will serve to document that the samples remained unaltered during the shipment via the common parcel carrier.
6. The laboratory will assume custody of the samples upon receipt and a designated sample custodian will be charged with sample receipt, completion of custody

forms, checking correctness of sample documentation, sample log-in, and sample distribution.

7. The laboratory will retain custody of the samples in a secure area until such time as the samples are destroyed.
8. The following information must be supplied to complete the chain-of-custody record:
    a. Project name
    b. Signature of sampler
    c. Sample location number, date and time of collection, grab or composite, media sampled sample designation, type of analysis required, and site name and location.
    d. Signatures of individuals involved in sample transfer, i.e., relinquishing and accepting samples. Individuals receiving the samples shall sign, date, and note the time that they received the sample, on the chain-of-custody record.
    e. In the comment section of the chain-of-custody record, the type of common carrier service, if any, will be indicated.

6.4 SAMPLE SHIPMENT PROCEDURES

Samples for analyses will be packaged in shipping containers for same day or overnight delivery to the analytical laboratory. Sample packaging for shipping procedures will be as follows:

1. Each sample container will be checked for a properly completed sample identification label.
2. A cooler or specific laboratory-prepared sample shipping container, will be used to ship the samples. Each cooler will have the drain plug shut. Ice or freezer packs will be placed in the bottom of the cooler.
3. Samples will be maintained at 4 degrees centigrade during shipment. Either ice or freezer packs will be used to keep the samples cool.
4. The chain-of-custody record will be placed in a plastic bag, sealed, and put inside the shipping container.
5. The cooler or shipping container will be taped closed with strapping tape.
6. Two signed and dated custody seals will be placed across the edges of the shipping container that can be opened.
7. Unless the sampling or laboratory delivery personnel transport the samples to the laboratory, the cooler will be relinquished to the courier with the required signed and dated shipping documentation.

7.0 CALIBRATION/ANALYTICAL PROCEDURES

7.1 LABORATORY CALIBRATION

Laboratory instruments will be calibrated following the referenced SW-846 analytical method protocols. Initial calibrations will be performed before sample analysis. Calibration checks will be performed at the frequencies specified in each analytical method. Additional information regarding laboratory equipment calibration is provided in Attachment B.

7.2 LABORATORY ANALYTICAL PROCEDURE

Analyses of groundwater and soil samples will be performed using SW-846 protocols. The choice of EPA-approved methodology is considered sufficient to meet project data quality objectives for these parameters.

7.2.1 ANALYTICAL QUALITY CONTROL

Analytical quality control methods are outlined within Attachment B.

7.3 FIELD CALIBRATION

PID screening instruments and other field meters that may be utilized will be calibrated by qualified technicians prior to being taken on-site. Calibration and battery checks will be performed daily by site sampling personnel.

Results of field calibrations and measurements will be maintained on forms assigned to the specific instrument and/or field logbooks. Initial calibrations of field instruments will be performed by a qualified technician prior to mobilization of equipment to the site. Daily calibrations will be performed on-site by sampling personnel. The recorded calibration information will include date of calibration, standards used, and calibration results.

7.4 FIELD PREVENTATIVE MAINTENANCE

Field instruments will be checked by qualified technicians prior to use in the field. A qualified technician will perform the required types and frequencies of maintenance checks on the field instruments. Instrument maintenance will be recorded on forms or in a logbook. Factory maintenance records are kept on file. Field maintenance will be performed as needed and recorded in the instrument logbook, form and/or field logbook.

8.0 DATA REPORTING

Deliverables/packages from the laboratory will be paginated in ascending order. The laboratory will keep a copy of the paginated package in order to be able to respond efficiently to data inquiries. Errors in reporting identified during the data review process must be corrected by the reporting laboratory. NJDEP reduced laboratory data deliverables will be provided.

8.1 DATA VERIFICATION AND USABILITY

Data will be reviewed by JMC staff upon completion of each sampling event. Laboratory confirmations provided upon IAL's receipt of field samples will be reviewed for sample name correctness and parameters to be analyzed for each sample. Upon the receipt of analyzed data, JMC staff will review data for completeness and accuracy.

8.2 RECONCILIATION WITH USER REQUIREMENTS

A data usability assessment will be performed to determine whether or not data meet criteria outlined in the IAL NJDEP Analytical Methods Technical Guidance QAPP with Laboratory Comment in Attachment B. In addition, field notes and purge guides (Attachment A) will be reviewed to verify that field SOPs were adhered to. In the event that SOPs are not adhered to, or laboratory QC Acceptance Limits are not met, data will be evaluated to determine its validity on a case by case basis.

9.0 ASSESSMENTS

Assessments will be performed by JMC staff throughout the project after each sampling event. A combination of self assessments to ensure sampling procedures outlined in Attachment A are adhered to, and a review of data results and field notes will be used to identify inconsistencies that may arise. The results of each self assessment will be reported to the project manager. Corrective actions will be addressed on a case by case basis with measures taken will be determined by the project manager.

9.1 PERFORMANCE AND SYSTEM AUDITS

The QA manager will be responsible for conducting surveillance during the length of the project and will initiate corrective actions as needed. This QAPP will be reviewed annually and revised as necessary. The QA manager assures that the revisions/updates receive necessary approvals and are distributed to the project team as identified above.

9.2 CORRECTIVE ACTION PROCESSES

Corrective actions include revising/updating the QAPP and adjusting field and/or laboratory procedures.

9.3 REPORTING, DOCUMENTS AND RECORDS

Project information, including sample collection and handling records, analytical logbooks, equipment calibration records, assessment reports, and field notes will be held on file within the JMC office in physical form. In addition, information will be held in electronic form on the JMC network at the same location.